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By: Frank Lollo

Signed: 

Date of signature and deposit/transmission:

6/19/06

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
Dwayne Cook

Serial No: 11/018,326

Filed: 12/21/2004

For: Ball Joint Seal

)
) Group Art Unit: 3679
)
) Examiner: Kennedy, Joshua T
)
) Attorney Docket: 1-25105
)
) Confirmation No: 1469

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

RESPONSE TO NOTICE OF NON-COMPLIANT AMENDMENT

In response to the Office Action of 6/6/2006, please enter the following amendment for the above identified application as follows:

Amendments to the Claims begin on page 2 of this paper.

Remarks begin on page 6 of this paper.

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AMENDMENTS TO THE CLAIMS

1. (Currently amended) A ball joint for connecting a first member of a vehicle to a second member of a vehicle, the ball joint comprising:

a housing including a cavity, said housing adapted to be coupled to the ~~first~~ second member;

a ball stud including a ball end portion received in said cavity and being pivotable in said cavity, said ball stud further including a shank portion extending from said ball end portion projecting from said socket, said shank portion adapted to be coupled to said ~~second~~ first member;

a flangeless tubular-shaped wear reducing member disposed only about a portion of said shank portion, said tubular-shaped wear reducing member having an inner side surface and an exterior side surface, said inner side surface sealingly disposed on a portion of said shank portion; and

an annular seal including a first end seal portion sealingly engaging said housing and a second end seal portion sealingly engaging said exterior side surface of said tubular-shaped wear reducing member, said second end seal portion being slideable along said exterior side surface of said tubular-shaped wear reducing member, wherein said tubular-shaped wear reducing member maintains a seal between said shank portion and said second end seal portion and reduces wear of said second end seal portion of said annular seal as said ball stud pivots within said cavity.

2. (Currently amended) The ball joint of claim 1 wherein said tubular-shaped wear reducing member includes heat shrink tubing.

3. (Currently amended) The ball joint of claim 1 wherein said tubular-shaped wear reducing member includes press fit tubing.

4. (Currently amended) The ball joint of claim 1 wherein said tubular-shaped wear reducing member is adhered to said shank portion.

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5. (Currently amended) The ball joint of claim 1 wherein said tubular-shaped wear reducing member comprises an elastomeric material.

6-13. (Cancelled)

14. (New) The ball joint of claim 2 wherein said heat shrink tubing is a polyolefin material.

15. (New) The ball joint of claim 14 wherein said polyolefin material includes polyethylene.

16. (New) The ball joint of claim 2 wherein said heat shrink tubing includes 2:1 heat shrink capabilities.

17. (New) The ball joint of claim 2 wherein said heat shrink tubing conforms to said underlying shank portion by exposing said heat shrink tubing to a heating device.

18. (New) The ball joint of claim 3 wherein said press fit tubing includes an oil impregnated bushing.

19. (New) The ball joint of claim 3 wherein said press fit tubing includes plastic composite bushing.

20. (New) The ball joint of claim 5 wherein adhesive is used to adhere said elastomeric material to said shank portion.

21. (New) A ball joint for connecting a first member of a vehicle to a second member of a vehicle, the ball joint comprising:

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a housing including a cavity, said housing adapted to be coupled to the second member;

a ball stud including a ball end portion received in said cavity and being pivotable in said cavity, said ball stud further including a shank portion extending from said ball end portion projecting from said socket, said shank portion adapted to be coupled to said first member;

a flangeless heat shrink tubular-shaped wear reducing member disposed only about a portion of said shank portion, said tubular-shaped wear reducing member having an inner side surface and an exterior side surface, said inner side surface sealingly disposed on a portion of said shank portion; and

an annular seal including a first end seal portion sealingly engaging said housing and a second end seal portion sealingly engaging said exterior side surface of said tubular-shaped wear reducing member, said second end seal portion being slideable along said exterior side surface of said tubular-shaped wear reducing member, wherein said tubular-shaped wear reducing member maintains a seal between said shank portion and said second end seal portion and reduces wear of said second end seal portion of said annular seal as said ball stud pivots within said cavity.

22. (New) The ball joint of claim 21 wherein said flangeless heat shrink tubular-shaped wear reducing member is adapted to said shank portion by exposure to heat.

23. (New) The ball joint of claim 22 wherein said flangeless heat shrink tubular-shaped wear is adapted to said shank portion by exposure to an oven.

24. (New) The ball joint of claim 22 wherein said flangeless heat shrink tubular-shaped wear reducing member is adapted to said shank portion by exposure to forced hot air.

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25. (New) The ball joint of claim 22 wherein said flangeless heat shrink tubular-shaped wear reducing member is adapted to said shank portion by exposure to a heat lamp.

26. (New) The ball joint of claim 21 wherein said flangeless heat shrink tubular-shaped wear reducing member includes an adhesive liner for adhering said tubular wear member to said shank portion.

27. (New) ball joint for connecting a first member of a vehicle to a second member of a vehicle, the ball joint comprising:

- a housing including a cavity, said housing adapted to be coupled to the second member;

- a ball stud including a ball end portion received in said cavity and being pivotable in said cavity, said ball stud further including a shank portion extending from said ball end portion projecting from said socket, said shank portion adapted to be coupled to said first member;

- a flangeless elastomeric tubular-shaped wear reducing member disposed only about a portion of said shank portion, said tubular-shaped wear reducing member having an inner side surface and an exterior side surface, said inner side surface sealingly disposed on a portion of said shank portion; and

- an annular seal including a first end seal portion sealingly engaging said housing and a second end seal portion sealingly engaging said exterior side surface of said tubular-shaped wear reducing member, said second end seal portion being slideable along said exterior side surface of said tubular-shaped wear reducing member, wherein said tubular-shaped wear reducing member maintains a seal between said shank portion and said second end seal portion and reduces wear of said second end seal portion of said annular seal as said ball stud pivots within said cavity.

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REMARKS

In response to the notice of non-compliant amendment, applicant has amended the claims to identify the status of each claim. The claims are now in condition for examination.

Applicant conducted a telephone conversation with examiner Mr. Joshua T. Kennedy on February 28, 2006 in which Mr. Kennedy informed applicant as to the restriction of the invention as follows:

- I. Claims 1-5, drawn to a ball joint.
- II. Claims 6-13, drawn to a method producing a reduced wear ball joint.

During the telephone conversation, the Examiner Kennedy required applicant to restrict the application to a single disclosed invention for prosecution on the merits which applicant provisionally elected Invention I without traverse.

In accordance with the Examiner's written restriction requirement, application elects to prosecute Invention I for which claims 1-5, drawn to a ball joint.

Claims 1-5 are pending. Claims 6-13 have been cancelled. Claims 14-27 have been added.

Claim 1 has been objected to due to formalities. Claim 1 is amended in accordance with the suggestions of the examiner. Therefore, the objection to claim 1 should be withdrawn.

The rejection of claims 1, 4, and 5 under 35 U.S.C. 102(b) as being anticipated by Gottschald (UW Patent 3,472,540) is respectfully traversed.

Claim 1 recites a ball joint for connecting a first member to a second member. The ball joint includes a housing having cavity and the housing is adapted to be coupled to the second member. A ball stud includes a ball end portion received in the cavity. The ball stud further includes a shank portion adapted to be coupled to the second member. A flangeless tubular-shaped wear reducing member includes an inner side surface and an exterior side surface with the inner side surface being sealingly disposed on a portion of the shank portion. An annular seal includes a first end seal portion and a second end seal portion. The second end seal portion is

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slideable along the exterior surface of the tubular-shaped wear reducing member while maintaining a seal between the shank portion and the second end seal portion. The tubular-shaped wear reducing member reduces wear of the second end seal portion.

Gottschald describes a ball joint assembly having a ball head 4, a joint pin 2, and a bellow 5 disposed about a portion of the ball head 4 and a portion of the joint pin 2. A socket 13 made of hard plastic is pushed onto the joint pin 2. A second end of the bellow (rim) 9 is seated within a pocket (of the socket) formed by a flange/radial collar 14 and a flange/bead rib 12. This second end of the bellow is also securely attached against the socket 13 by a spring ring 10. Gottschald provides an elaborate collar socket member where second end of the bellow is securely captured between two flange members (the flange/radial collar 14 which also includes a rim 15 and the flange/bead rib 12 and is further securely fixed by the spring ring 10.

The second end portion, as recited in claim 1, is slidably and sealingly engaged against a flangeless tubular-shaped wear reducing member that is neither shown nor suggested by Gottschald. In fact, Gottschald teaches away from this limitation of claim 1 since Gottschald captures and prevents movement of the second end by the flange members. Gottschald is securing and fixing the second end to the socket. The flangeless tubular-shaped wear reducing member of claim 1 does not include any flanges or beads for capturing the second end portion, nor is a clamping member utilized to secure the second end portion of the seal against the tubular-shaped wear reducing member. Rather, flangeless tubular-shaped wear reducing member extends entirely co-axial to the underlying shank portion and the second end portion is freely slideable over the flangeless tubular-shaped wear reducing member. This provides the advantage of allowing the annular seal to re-adjust itself while still maintaining a seal as the ball stud pivots as opposed to Gottschald where the seal is secured to a single position which would cause the seal to stretch and elongate over time. Gottschald neither describes nor teaches a second end of an annular seal being slideable along a flangeless tubular-shaped wear reducing member. Since Gottschald neither teaches nor suggests each of the limitations of claim 1, Gottschald does not anticipate claim 1. Therefore, claim 1 is allowable.

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Claim 4 recites the tubular member being adhered to the shank portion. The office action references Col. 2, lines 29-48 of Gottschald to show the limitation of adhering the tubular wear member to the shank portion; however, this is neither shown nor suggested in this referenced section. Gottschald only describes pushing the socket member onto the shank but fails to teach or suggest adhering the tubular wear member on to the shank. Therefore, claim 4 is allowable.

Claim 5 depends from claim 1 and is therefore allowable.

The rejection of claims 1, and 3 under 35 U.S.C. 102(b) as being anticipated by Yokoyama (US Patent Application Publication 2003/0156895) is respectfully traversed.

Yokoyama describes a metal ring made of a metal pipe that includes a cylindrical portion and a pair of large and small flanges. Yokoyama includes flanges on the metal pipe that retain the end of the seal therebetween.

The flangeless tubular-shaped wear reducing member, as recited in claim 1, does not include flanges. The seal is not bound by the tubular seal member and is freely slideable along its exterior surface. Yokoyama fails to teach or suggest a flangeless tubular-shaped wear reducing member. Therefore, claim 1 is allowable.

Claim 3 depends from claim 1 and is therefore allowable.

The rejection of claim 2 under 35 U.S.C. 103(a) as being unpatentable over Yokoyama in view of Marx (US Patent 4, 372, 429) is respectfully traversed.

Claim 2 recites the tubular wear member includes heat shrink tubing.

Yokoyama describes a metal ring made of a metal pipe that includes a cylindrical portion and a pair of large and small flanges.

Marx describes a gas spring assembly having an elongated cylinder where a portion of the cylinder is encompassed by a cylindrical boot. The end of the boot includes an annular bead which is stretched over the cylinder to maintain a relatively tight seal against the cylinder. A protective sheath encompasses both the boot and a portion of the cylinder (see col. 4, lines 32-37). The protective sheath essentially

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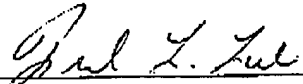
wraps over both the boot and cylinder for insuring a tight seal (wrap) between the bead and the cylinder. In addition, Marx describes the protective sheath as becoming brittle, cracking, and ultimately falling off from the cylinder and boot (see col. 4, lines 59-67).

The heat shrink tubular-shaped wear member, as recited in claim 2, is disposed between the seal and the shank, in contrast to Marx which wraps the boot onto the cylinder. The purpose of the heat shrink tubular-shaped wear reducing member, recited in claim 2, is to reduce the friction, and hence, the wear between the seal and the shank as the seal slides over the shank. The citation of a single reference that merely shows a protective sheath that neither functions nor is implemented as that recited in the present invention can hardly be said to be combinable to suggest the limitations of claim 2. There is no teaching or suggestion to modify the metal ring of Yokayama with the protective sheath of Marx to form the flangeless wear member when the Marx does not even utilize or suggest the use of the protective sheath as an intermediate layer to reduce friction. Yokayama and Marx fail to teach or suggest, either individually or in combination, the limitations of claim 2. Therefore, claim 2 is allowable.

In view of the foregoing amendment and remarks, all pending claims are in condition for allowance. Favorable action is respectfully solicited.

Respectfully submitted,

Date: 6/19/06


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